WHAT IS CLAIMED

1. An intercalate, capable of being exfoliated, formed by contacting a layered material with an intercalating composition including an intercalant monomer, oligomer or polymer surface modifier that is a reaction product of at least one diamine and at least one dicarboxylic acid, said reaction product having at least one amine group that is protonated for ion-exchange with an interlayer cation of the layered material, to achieve ion-exchange of the protonated amine group of the intercalant surface modifier with the interlayer cation of the layered material, between adjacent spaced layers of the layered material, to expand the spacing between a predominance of the adjacent platelets of said layered material at least about 5 Å, when measured after sorption of intercalant surface modifier.

2. An intercalate in accordance with claim 1, wherein the concentration of intercalant surface modifier in said intercalating composition is at least about 0.1% by weight, based on the weight of water organic solvent for the surface modifier, and intercalant monomer surface modifier in the intercalating composition.

3. An intercalate in accordance with claim 1, wherein the concentration of the intercalant surface modifier in said intercalating composition is at least about 15% by weight, based on the dry weight of the phyllosilicate in the intercalating composition.

4. An intercalate in accordance with claim 3, wherein the concentration of the intercalant surface modifier in said intercalating composition is at least about 20% by weight.

5. An intercalate in accordance with claim 4, wherein the concentration of the intercalant surface modifier in said intercalating composition is at least about 30% by weight based on the dry weight of the phyllosilicate in the intercalating composition.

6. An intercalate in accordance with claim 5, wherein the concentration of the intercalant surface modifier in said intercalating composition in the range of about 50% to about 80% by weight.

7. An intercalate in accordance with claim 6, wherein intercalant surface modifier does not include an onium ion or a silane coupling agent.

8. An intercalate in accordance with claim 3, wherein the concentration of the intercalant surface modifier in the intercalating composition is at least about 16% by weight.

9. An intercalate in accordance with claim 8, wherein the concentration of the intercalant surface modifier in the intercalating composition is in the range of about 16% to about 200% by weight.

10. An intercalate in accordance with claim 9, wherein the concentration of the intercalant surface modifier in the intercalating composition is in the range of about 16% to less than about 35% by weight.

11. An intercalate in accordance with claim 9, wherein the concentration of the intercalant surface modifier in the intercalating composition is in the range of about 35% to less than about 55% by weight.

12. An intercalate in accordance with claim 9, wherein the concentration of the intercalant surface modifier in the intercalating composition is in the range of about 55% to less than about 70% by weight.

13. A method of exfoliating a layered silicate material comprising:

contacting the phyllosilicate with an intercalating composition comprising at least about 2% by weight of an oligomeric intercalant surface modifier that is a reaction product of at least one diamine and one dicarboxylic acid, said reaction product having at least one amine group that is protonated for ion-exchange with an interlayer cation of the layered silicate material, to intercalate the oligomeric intercalant surface modifier between adjacent silicate platelets of the layered silicate material to form an intercalate; and

separating the platelets of the intercalate.

14. The method of claim 13, wherein the intercalate is exfoliated into a predominance of individual platelets.

15. A method of manufacturing a composite material containing about 10% to about 99.95% by weight of a matrix polymer selected from the group consisting of a thermoplastic polymer, a thermosetting polymer, and mixtures thereof, and about 0.05% to about 60% by weight of exfoliated platelets of a phyllosilicate material comprising:

contacting the phyllosilicate, with water and an intercalant surface modifier that is a reaction product of at least one diamine and one dicarboxylic acid, said reaction product having at least one amine group that is protonated for ion-exchange with an interlayer cation of the layered material, to intercalate the phyllosilicate with the intercalant surface modifier and form an intercalate;

combining the intercalate with said matrix polymer;

exfoliating a majority of the platelets of said intercalate into individual platelets; and

dispersing said exfoliated platelets throughout said matrix polymer.

16. A composite material comprising a matrix polymer in an amount of about 40% to about 99.95% by weight of the composite material, and about 0.05% to about 60% by weight exfoliated platelets of a phyllosilicate material, said platelets derived from the intercalated layered material of claim 1.

17. A method of manufacturing a composite material containing about 40% to about 99.95% by weight of a matrix thermoplastic or thermosetting polymer, and about 0.05% to about 60% by weight of exfoliated platelets of a phyllosilicate material, comprising:

contacting the phyllosilicate with an intercalating composition including an intercalant monomer, oligomer, or polymer surface modifier that is a reaction product of at least one diamine and at least one dicarboxylic acid, said reaction product having at least one amine group that is protonated for ion-exchange with an interlayer cation of the layered material to form an intercalate;

combining the intercalate with said thermoplastic or thermosetting polymer, and heating the thermoplastic polymer sufficiently to provide for flow of said thermoplastic polymer and delamination of the platelets of said phyllosilicate; and

dispersing said delaminated platelets throughout said matrix polymer.

18. A method in accordance with claim 13, wherein the amount of intercalant surface modifier intercalated into the phyllosilicate material is 10-200% intercalant surface modifier, based on the dry weight of the phyllosilicate material.

19. A method in accordance with claim 13, wherein the amount of intercalant surface modifier intercalated into the phyllosilicate material is about 15% to about 80%, based on the dry weight of the phyllosilicate material.

20. An intercalate, capable of being exfoliated, formed by contacting a layered silicate material with an intercalating composition including an intercalant monomer, oligomer or polymer surface modifier that is a reaction product of at least one diamine and at least one dicarboxylic acid, without an onium ion spacing agent, said reaction product having at least one amine group that is protonated for ion-exchange with an interlayer cation of the layered material, to form an oligomer intercalant surface modifier and to achieve ion-exchange of the protonated amine group of the oligomer intercalant surface modifier with the interlayer cation of the layered material, between adjacent spaced layers of the silicate layered material, to expand the spacing between a predominance of the adjacent platelets of said silicate layered material at least about 5 Å, when measured after sorption of intercalant surface modifier.

21. An intercalate in accordance with claim 20, having formula 1, 2, or 3 as follows, wherein "B" represents a xylylenediamine-component-containing Base, and "A" represents a dicarboxylic acid, wherein at least one of the B components includes a protonated amine functionality, and wherein n=1-20; and m=0-20:

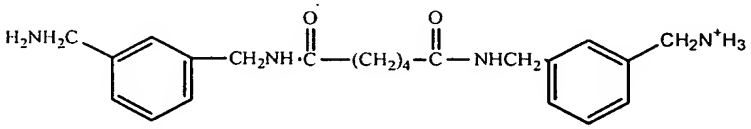
$$B(AB)_n \qquad 1$$
$$B(AB)_mA \qquad 2$$

22. An intercalate in accordance with claim 21, wherein B is a xylylenediamine comprising at least 60 mole % m-xylylenediamine.

23. An intercalate in accordance with claim 22, wherein A is selected from adipic acid and succinic acid.

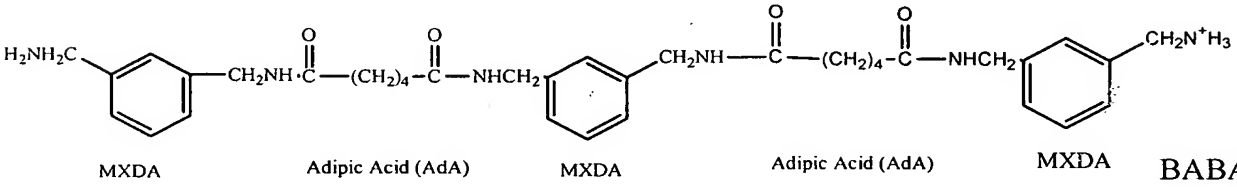
24. An intercalate in accordance with claim 20, wherein the intercalant has a structural formula I, II, III, IV, V, VI, or a combination of any two or more:

I.



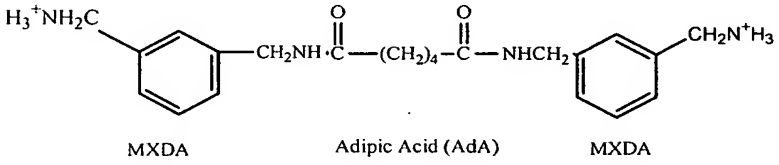
BAB^+

II.



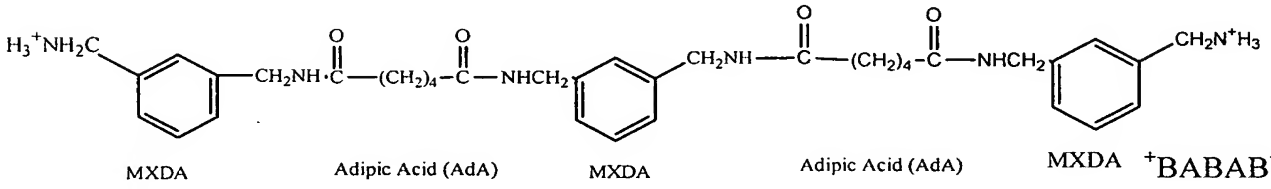
$BABAB^+$

III



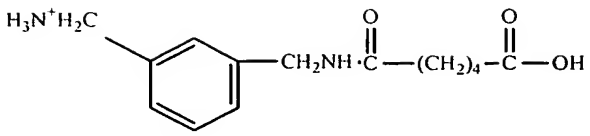
$^+BAB^+$

IV.



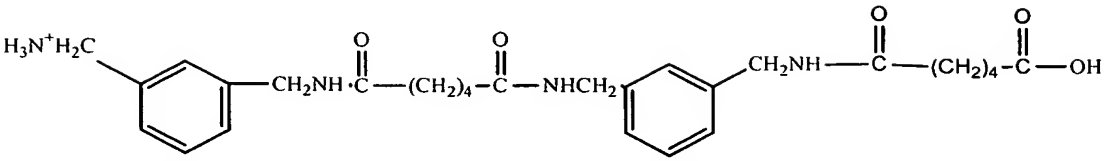
$^+BABAB^+$

V.



MXDA Adipic Acid (AdA) $^{+}$BA

VI.



MXDA Adipic Acid (AdA) MXDA Adipic Acid (AdA) $^{+}$BABA

25. An intercalate, capable of being exfoliated, formed by contacting a layered silicate material with an intercalating composition including at least one diamine and at least one dicarboxylic acid, polymerized and amine-protonated while in contact with the layered silicate material to form an intercalant surface modifier containing a xylylenediamine component to achieve ion-exchange of the protonated amine group of the intercalant surface modifier with an interlayer cation of the layered material, between adjacent spaced layers of the layered material, to expand the spacing between a predominance of the adjacent platelets of said layered material at least about 10 Å, when measured after sorption of intercalant surface modifier.

26. An intercalate in accordance with claim 25, wherein the concentration of the xylylenediamine component in the intercalant surface modifier is at least 50 mole %.

27. An intercalate in accordance with claim 26, wherein the concentration of the xylylenediamine component in the intercalant surface modifier is at least 70 mole %.

28. An intercalate in accordance with claim 25, wherein xylylenediamine component comprises at least 60 mole % m-xylylenediamine.

29. An intercalate in accordance with claim 28, wherein the xylylenediamine component comprises at least 70 mole % m-xylylenediamine.

30. An intercalate in accordance with claim 29, wherein the xylylenediamine component comprises at least 80 mole % m-xylylenediamine.

31. An intercalate in accordance with claim 30, wherein the xylylenediamine component comprises at least 95 mole % m-xylylenediamine.

32. An intercalate in accordance with claim 25, wherein the dicarboxylic acid comprises at least 50 mole % alpha, omega-straight chain aliphatic dicarboxylic acid.

33. An intercalate in accordance with claim 32, wherein the dicarboxylic acid comprises at least 60 mole % alpha, omega-straight chain aliphatic dicarboxylic acid.

34. An intercalate in accordance with claim 33, wherein the dicarboxylic acid comprises at least 70 mole % alpha, omega-straight chain aliphatic dicarboxylic acid.

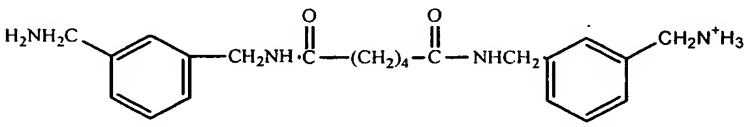
35. An intercalate in accordance with claim 37, wherein the dicarboxylic acid comprises at least 80 mole % alpha, omega-straight chain aliphatic dicarboxylic acid.

36. An intercalate in accordance with claim 28, wherein the xylylenediamine component comprises up to about 40 mole % p-xylylenediamine.

37. An intercalate in accordance with claim 32, wherein the alpha, omega-straight chain aliphatic dicarboxylic acid has 6 to 24 carbon atoms.

38. An intercalate in accordance with claim 36, wherein the dicarboxylic acid is selected from the group consisting of adipic acid, sebacic acid, suberic acid, undecanoic acid, dodecanedioic acid, eicosanedioic acid, terephthalic acid, isophthalic acid, and combinations thereof.

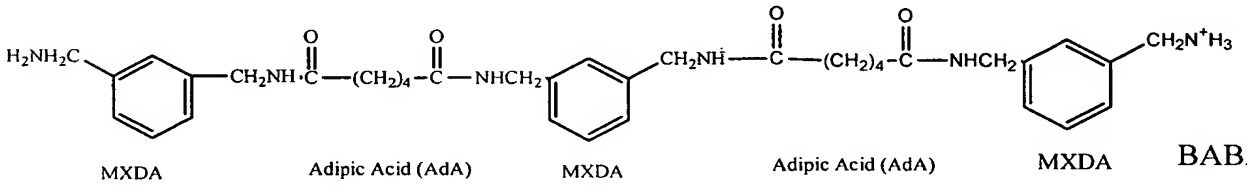
39. A method of exfoliating layered silicate material in accordance with claim 13, wherein the intercalate is selected from the group consisting of formulas I, II, III, IV, V, VI or a combination of any two or more:



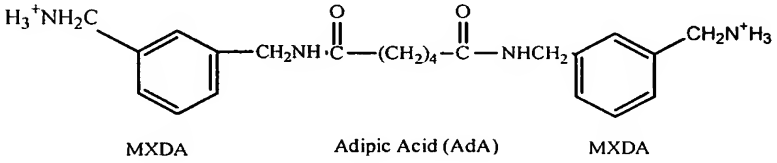
I.

BAB^+

II.



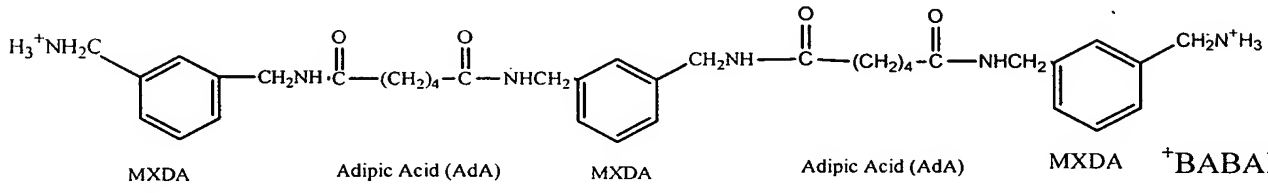
$BABAB^+$



III.

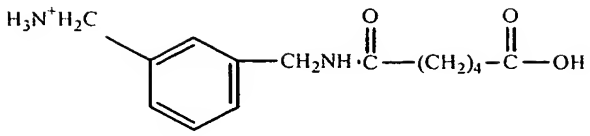
$^+BAB^+$

IV.



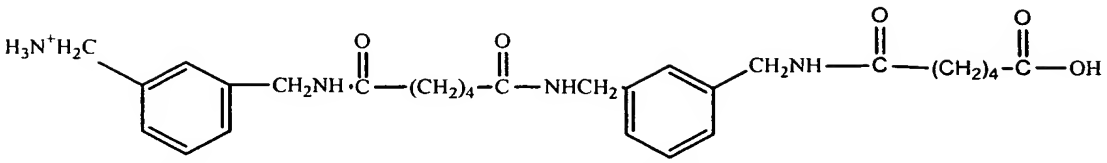
$^+BABAB^+$

V.



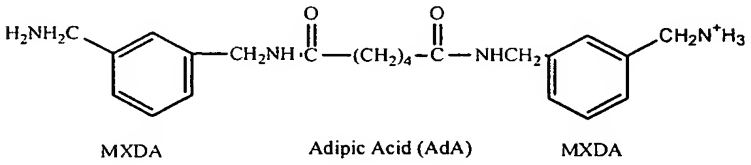
MXDA Adipic Acid (AdA) ^{+}BA

VI.



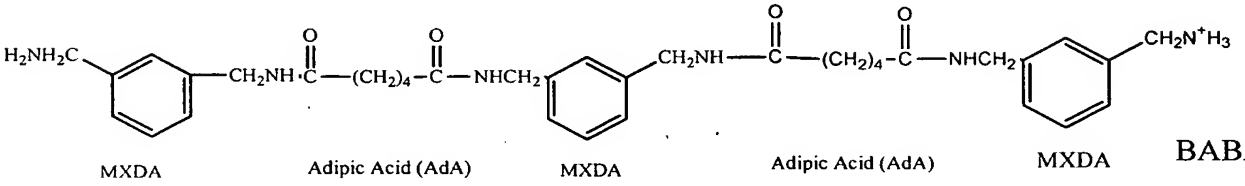
MXDA Adipic Acid (AdA) MXDA Adipic Acid (AdA) $^{+}BABA$

40. A method of manufacturing a composite material in accordance with claim 20, wherein the intercalate is selected from the group consisting of formulas I, II, III, IV, V, VI or a combination of any two or more:



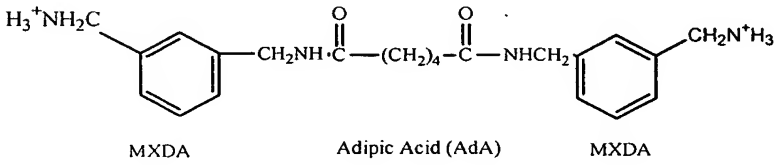
I.

BAB^+



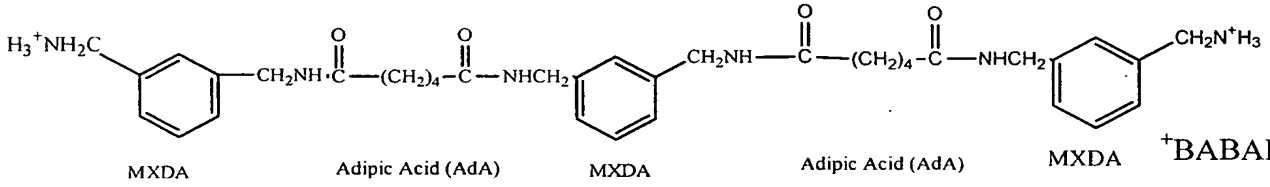
II.

$BABAB^+$



III.

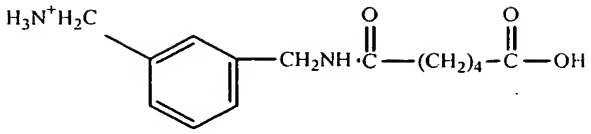
$^+BAB^+$



IV.

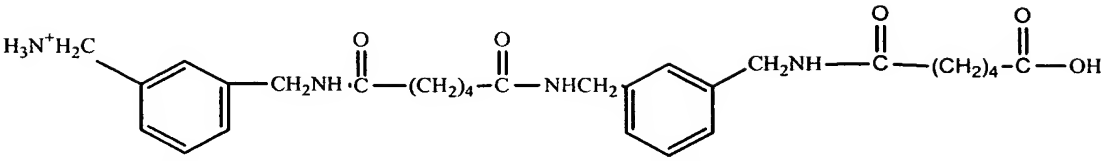
$^+BABAB^+$

V.



MXDA Adipic Acid (AdA) ^{+}BA

VI.



MXDA Adipic Acid (AdA) MXDA Adipic Acid (AdA) $^{+}BABA$